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NEW MEASURE SEEN FOR SOVIET A-TEST

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WASHINGTON, Nov. 3 — Accusations by the Reagan Administration that Soviet underground nuclear tests may have violated treaty limits are based on faulty assumptions, according to a group of scientists.

The experts, chosen by the Pentagon to study test verification methods, have recommended that the Government revise its procedures for estimating the power of Soviet tests. The Administration has said the test explosions were "likely" to have been bigger than the legal limit.

The panel of eight scientists made its recommendation last month in a classified report to a Pentagon research agency and to Richard L. Wagner Jr., the assistant Defense Secretary for atomic energy.

If the group's recommendation is followed, the Government's estimates of the yield of Soviet tests would be lowered by about 20 percent, according to experts familiar with the report. An Administration official said the panel's report would lead to a reassessment of whether the Russians had violated the treaty.

The Threshold Test Ban Treaty, signed by the United States and the Soviet Union in 1974, states that each side cannot conduct tests of explosives greater than 150 kilotons, the equivalent of 150,000 tons of TNT. Both sides have said they would abide by the treaty's limits, but the Administration has not ratified the agreement, saying it could not be verified unless American observers were allowed to conduct measurements at Soviet test sites.

On Feb. 1 the Administration said in a report to Congress, "Soviet nuclear testing activities for a number of tests constitute a likely violation of legal obligations under the Threshold Test Ban Treaty of 1974."

Report to Congress Is Due

The scientists' study comes as the Administration is preparing the latest in a series of reports to Congress on Soviet compliance with arms control agreements. It is due by Dec. 1.

While the development of new weaponry has gained widespread public attention, advances in verification technology and analysis have not. Nevertheless, as in the debate over Soviet underground tests, the science of verification has sometimes played a role in the dispute over arms control policy.

"Our knowledge of seismological methodologies has significantly improved over the past five years," said Thomas H. Jordan, a professor of geophysics at the Massachusetts Institute of Technology, who was chairman of the expert panel. "We have seen a steady advance in capability."

The Defense Intelligence Agency recently completed a separate classified review that includes seismic and nonseismic data, such as intercepted Soviet communications. Some experts who have read the report say the review concludes that seismic information is still the most important and reliable method for evaluating the yield of Soviet tests.

But that has not convinced some Administration officials, who have taken an aggressive stance on the issue of Soviet compliance.

'We Use All Sources of Data'

"While the seismic community tends to be the most vocal, we use all sources of data when we do the analysis," said Manfred Eimer, assistant director of the bureau of verification and intelligence at the Arms Control and Disarmament Agency.

Mr. Eimer said that further consideration of the issue was necessary, adding he could not yet say if the scientists' report would have an important influence on the Administration's evaluation of Soviet compliance.

Seismology provides a window into the secret world of verification research; much seismic research is unclassified and has application in nonmilitary matters, such as the measurement of earthquakes.

Underlying the debate over allegations of Soviet cheating is a dispute over whether the current Administration view takes sufficient account of distorting effects due to differences in geology at United States and Soviet test sites. The treaty provides for the exchange of geological data, but because the United States has not ratified it, no data have been exhanged.

Geology in Nevada More Active

Experts say the Nevada Test Site, 65 miles northwest of Las Vegas, is more geologically active than the Soviet test site at Semipalatinsk in central Asia. Some of the rocks beneath the Nevada site are belived to be partly molten. In contrast, the Soviet test site "is older, cooler and more stable," said Willard J. Hannon, who manages a seismic monitoring research program of the Lawrence Livermore National Laboratory in California.

As a result of this and other differences, scientists say, some types of seismic waves are stronger at the Soviet test site than they are at the test area in Nevada. Thus, a test explosion in the United States produces a smaller discernible wave traveling through the earth's interior than a Soviet test of the same magnitude.

This anomaly has long been known, and Government estimates of the size of Soviet tests, based on seismic signals, have tried to take it into account by introducing a corrective factor in their calculations. But there has been a debate over how big the correction should be.

The panel of scientists was commissioned in 1983 by the Defense Advanced Research Projects Agency to determine the size of the correction, or bias value, necessary in figuring the size of Soviet tests. Several other Government reviews, including one by the Air Force Technical Applications Center, have also reached the general conclusion that current procedures for evaluating the size of Soviet tests should be changed in a way that would give a lower figure.

To evaluate the distorting affect of different geologic structures on the measurements of seismological waves traveling through the earth's interior, the scientific panel reviewed measurements taken near Ontario of United States detonations. The Canadian site is believed to have a similar geology to that of the central Asian part of the Soviet Union. These readings were compared with measurements from seismic instruments in Nevada.

The panel also pursued ways to estimate the size of Soviet tests by measuring surface waves, which travel in the upper layers of the earth. Measurements of these waves have been distorted by other factors, the scientists said, and they hoped to discover ways to improve their calculations.

"What happens is that the natural stresses and pressures in the earth are released" by the effects of a nuclear blast, said Lynn R. Sykes of the Lamont-Doherty Geological Obseratory of Columbia University, who is a member of the study panel. The release of these pressures, he added, is "equivalent to a small earthquake" and has a "contaminating effect" on surface wave meausures.

To deal with this problem, the researchers used a mathematical procedure to distinguish between the surface waves of earthquakes and detonations.

A third approach involved readings based on another type of surface wave that bounces around the crust of the earth and propagates over short distances. Important research on this phenomenon has been carried out by Otto Nuttli of Saint Louis University, also a panel member.

1965 Soviet Explosion Studied

The panel scientists also studied a 1965 nuclear explosion that the Russians used to build a dam in the region of the current Soviet test site. Information about that explosion is available in Soviet technical literature.

"All of this is being done in lieu of getting calibration information from the Soviet test site," said Dr. Ralph W. Alewine 3d, the Defense Department research scientist who helped organize the panel. "If we could get onto the Soviet test site and make our own independent estimate of the yield, this is infinitely more valuable to us to calibrate the seismological methods."

Dr. Alewine declined in an interview to discuss the panel's recommendations, but added that "we have the best people in the United States working on this."

But others familiar with the report said that these different approaches also pointed to the need to revise the formula used to estimate the yield of Soviet tests in a way that would give lower measurements.

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"The bias value recommended is significantly higher than what is typically used to determine the official estimates of yield," said one expert who has reviewed the report. "Based upon the best estimate, we certainly cannot reject the hypothesis that the the Soviets are complying" with the threshold test ban treaty.

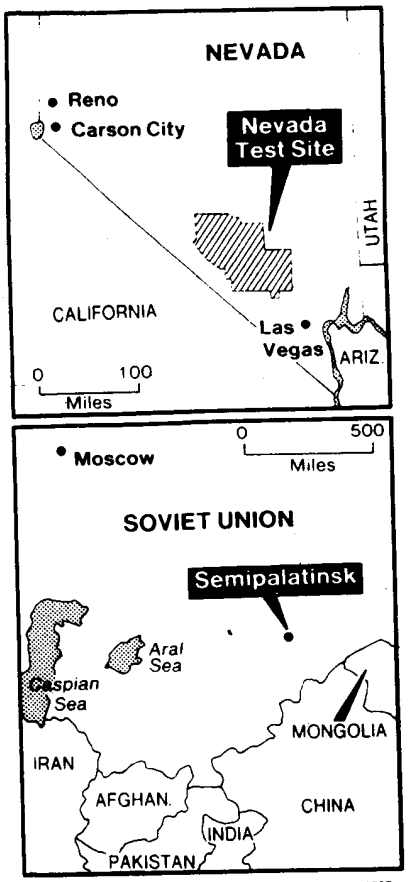
The expert, who asked not to be identified, said that measurements using the panel's correction factor showed that some Soviet tests would still be over 150 kilotons. But, he said, "given the uncertainty we would not be comfortable in saying 'we caught you.'"

Mr. Eimer of the arms control agency said that seismic assessments of Soviet test yields still are highly uncertain. A revised method of estimating the yield of Soviet tests would not by itself establish that the threshold treaty is verifiable, he said, adding that additional verification steps would be necessary. The Administration has argued that American experts must take direct measurements of a Soviet test in order confidently establish the accuracy of its seismic data.

But Mr. Jordan, who was chairman of the review panel, disagreed. "It appears to me right now that we can verify the Threshold Test Ban Treaty with existing national technical means," he said.

Spending on Verification

The budget for new strategic weaponry in the fiscal year 1985, $17 billion, dwarfed that for research on verification methods. The Defense Department research agency, for example, spent $14 million in 1985 on the problem of verifying nuclear test limitions and test ban agreements.



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Atomic testing sites for United States and Soviet Union.